Danfoss EKE 347 Liquid Level Controller Installation Guide

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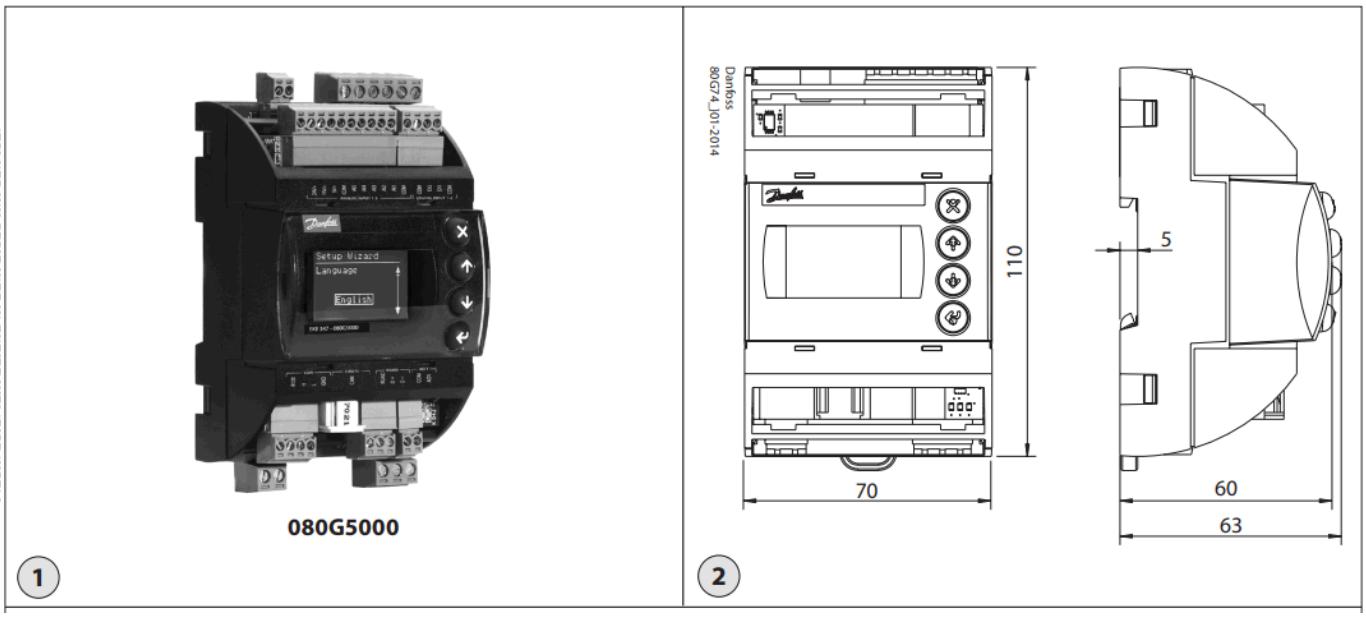
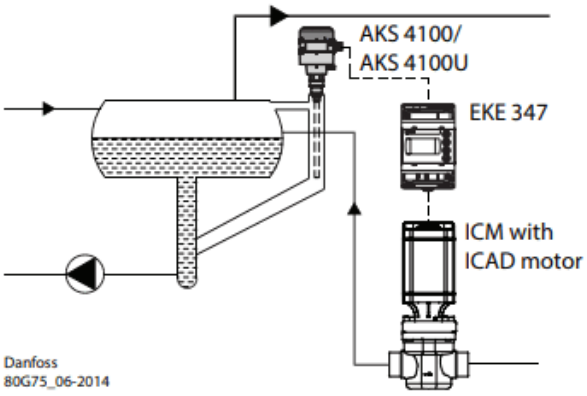
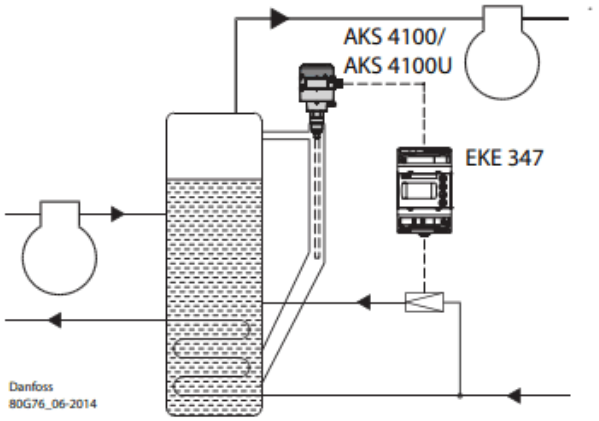


Liquid Level Regulating principle



3a



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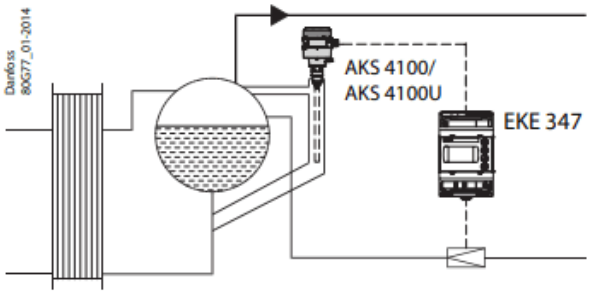

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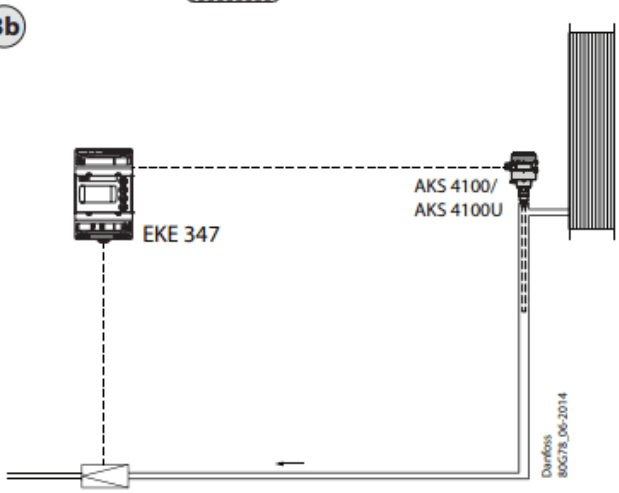
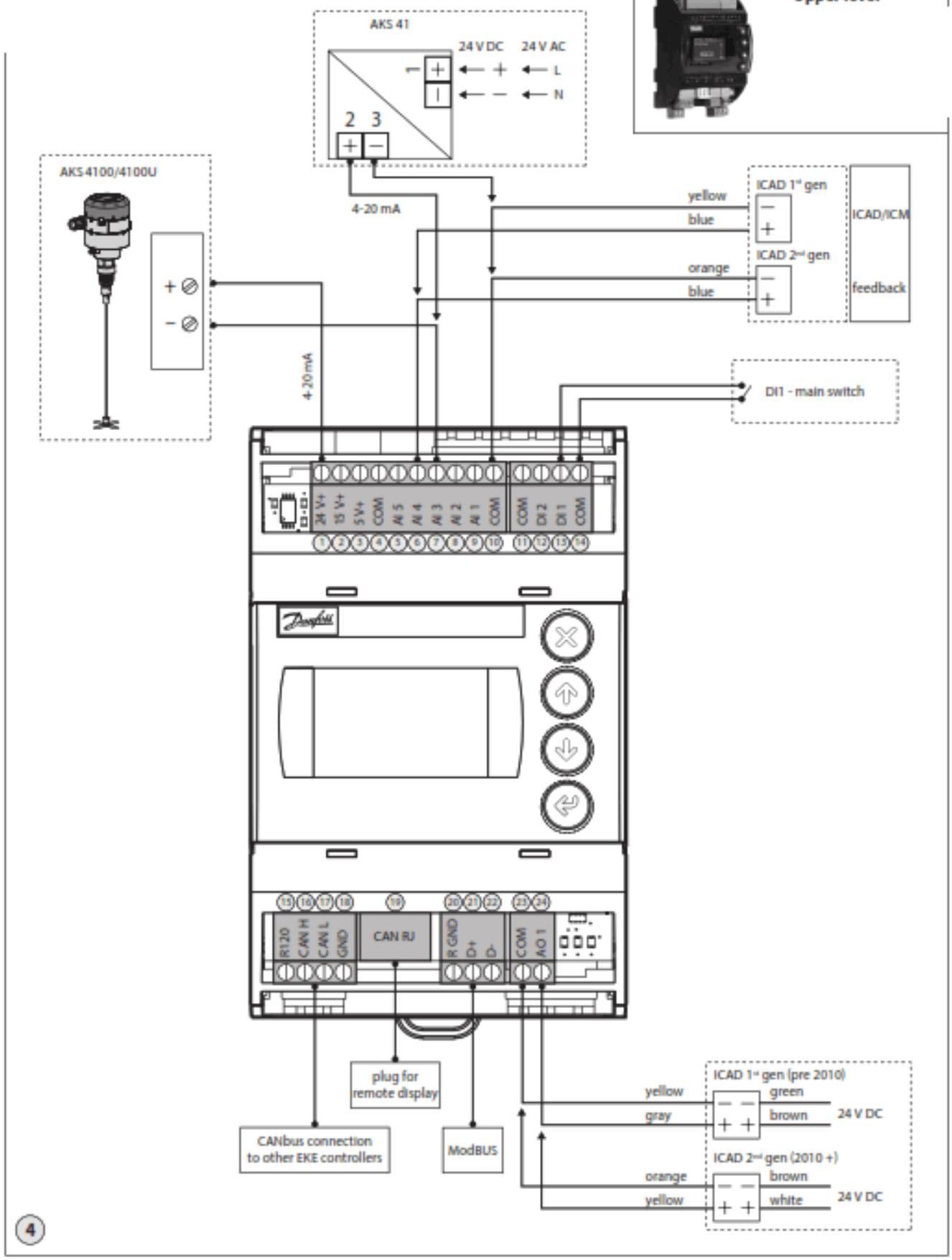


3d

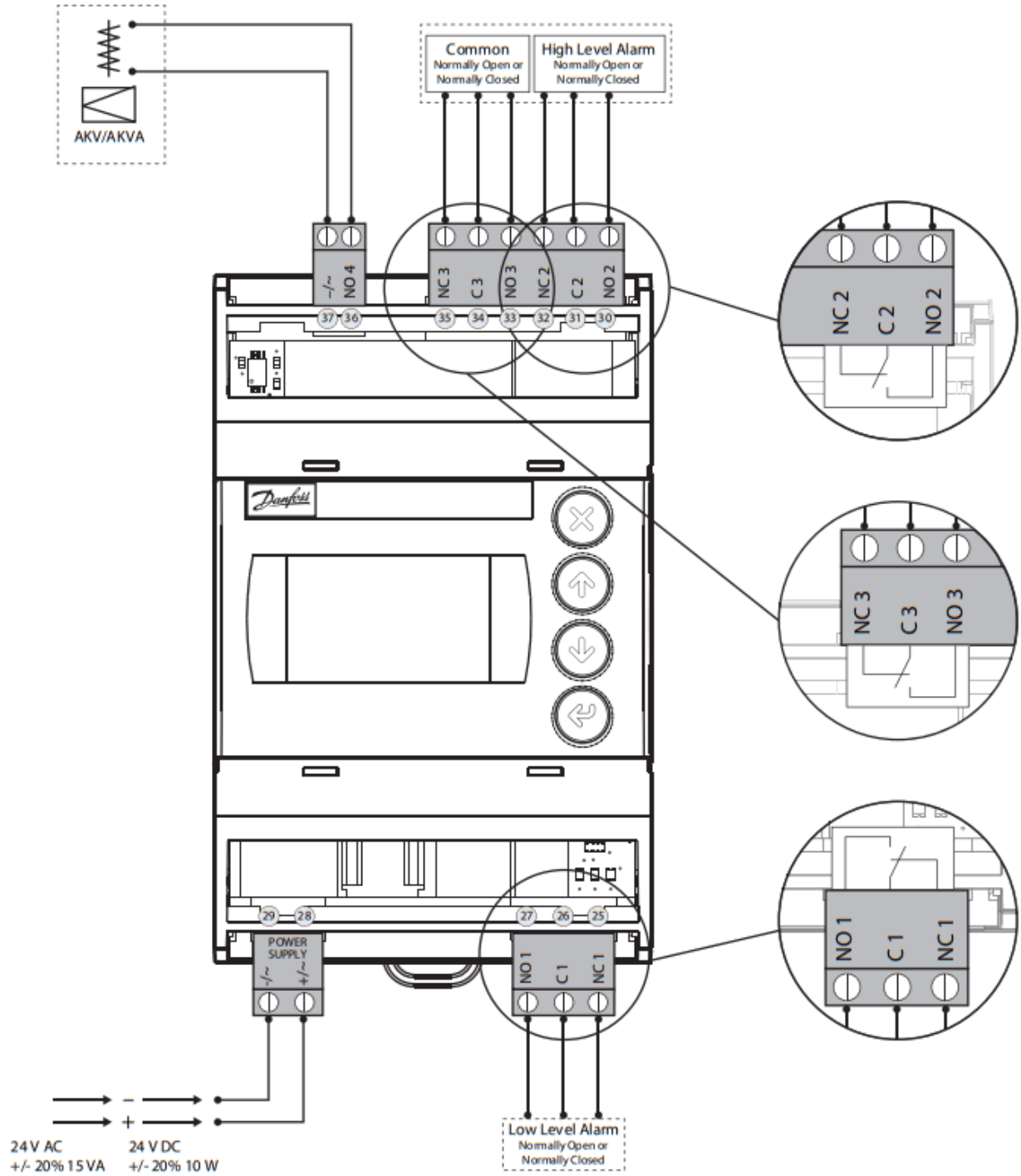
Connections - upper level

Upper level

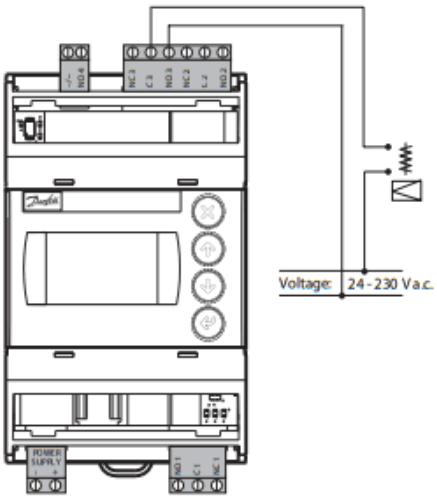


Connections - lower level

Lower level



EKE 347 - ON/OFF Application.
Open/Close solenoid valve with coil 24V - 230V



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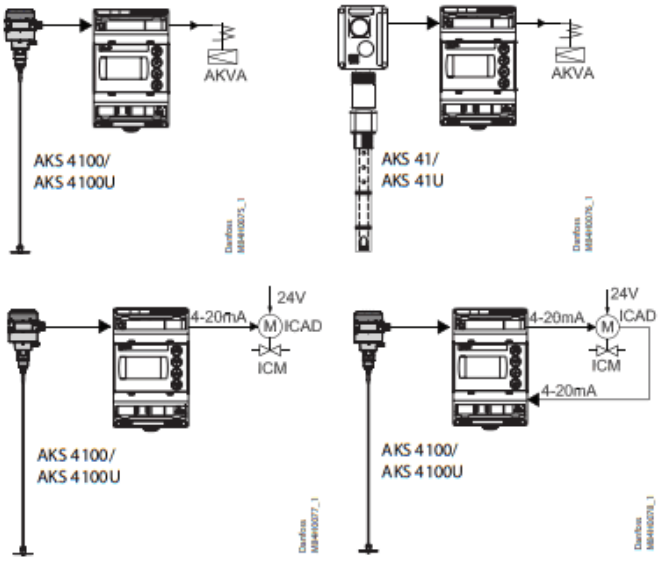
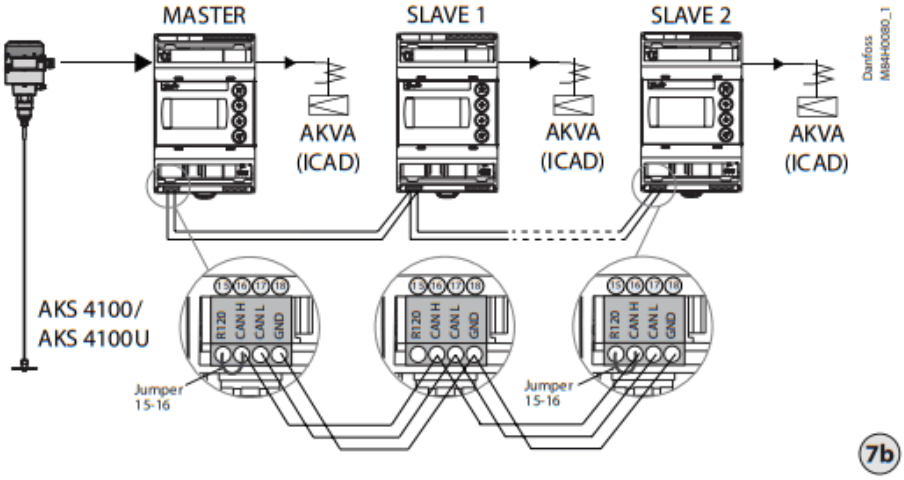
Connection examples



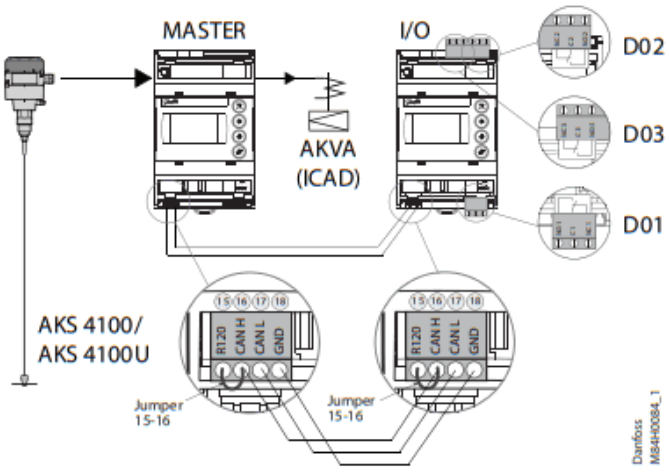
7a

MASTER / SLAVE configuration



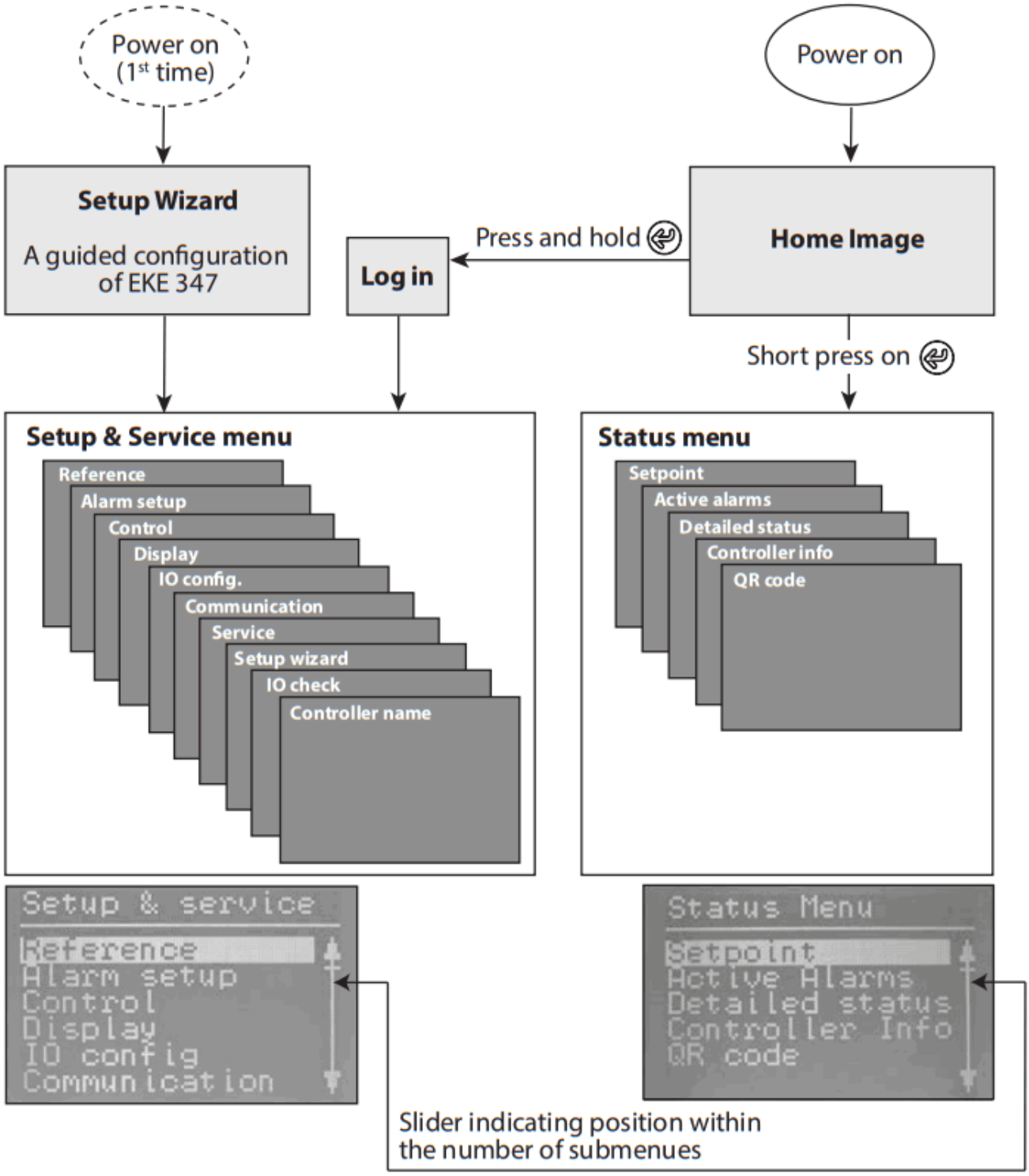
7b

I/O configuration



7c


Back - Press and hold = Log Out
Retour
Home Image
EKE 347
52.0 %
Stop
0.0
OFF
15
OFF
85
Scroll up / Hoch scrollen
Scroll down
Enter - Press and hold = Log In
Flashing bell = Active alarm
Controller name
Controller mode
Actual liquid level
Lower level alarm off (pump on)
Valve opening degree
Upper level alarm off



Contents

Liquid Level Regulating principle

Fig. 3a:
LOW

System configuration	ICAD
Regulating principle	Low
Level Signal setup	AKS 4100

Fig. 3b:
LOW

System configuration	AKV/A
Regulating principle	Low
Level Signal setup	AKS 4100

Fig. 3c:
LOW

System configuration	AKV/A
Regulating principle	Low
Level Signal setup	AKS 4100

Fig. 3d:
HIGH

System configuration	AKV/A
Regulating principle	High
Level Signal setup	AKS 4100

Necessary connections (fig. 4, 5 and 6)

Terminals:
28-29 Supply voltage 24 V a.c. or d.c. 1-7 Signal from level transmitter type AKS 4100/4100U or 7-10 Signal from level transmitter type AKS 41
36-37 Expansion valve type AKV or AKVA (see note to the right) or
23-24 Expansion valve type: ICM with ICAD 13-14 Switch function for start/stop of the controller. If a switch is not connected, terminals 13 and 14 must be shortcircuited.

Application-dependent connections (fig. 4, 5 and 6)
Terminals:
33-35 Relay for common alarm. The installer can choose between Normally Open (33-34) or Normally Closed (34-35) circuits. The relay will switch according to the programmed setting.
25-27 Relay for low-level limit. The installer can choose between Normally Open (26-27) or Normally Closed (25-26) circuits. The relay will switch when the set value is passed.
30-32 Relay for upper-level limit. The installer can choose between Normally Open (30-31) or Normally Closed (31-32) circuits. The relay will switch when the set value is passed.
6-10 ICM valve feedback signal from ICAD 0/4-20 mA
Note!

If AKV(A) is used, the power supply must cover the AKV(A) coil wattage additionally (see fig. 5). AKV(A) Coil voltage must be the same as controller supply voltage AC or DC.

MASTER/SLAVE and I/O configuration (fig. 7b and 7c) When more controllers are connected via CAN bus each end of the bus must be terminated with a jumper between 15 and 16.

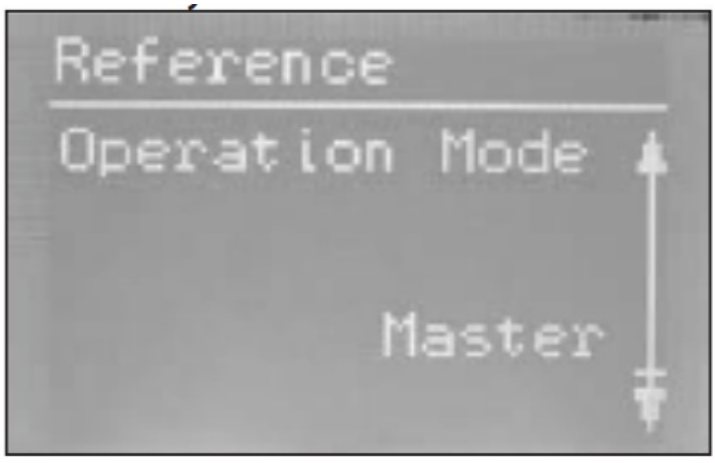
Control Panel (fig. 8)

The user interface of the control panel consists of a multiline display and 4 individual push buttons: Enter button, Page up button, Page down button, and Back button.
Fig. 8 shows the Home display image, which gives the actual overview. This is the starting point for entering into menus, and you will revert to this image by pushing 1 – 3 times depending on the actual position).

Display (fig. 9)
The display itself shows the state of Liquid level, Controller Mode (controller On/ Off), Valve opening degree, Lower level alarm (on = no alarm present) and Upper
level alarm (off = no alarm present).
Additional to the external connected alarm audio/video sources, a Bell symbol will flash in the upper right corner in case of an alarm.
To see more details on system performance and setting of parameters, 2 different main menu levels can be reached by operation of the push buttons.

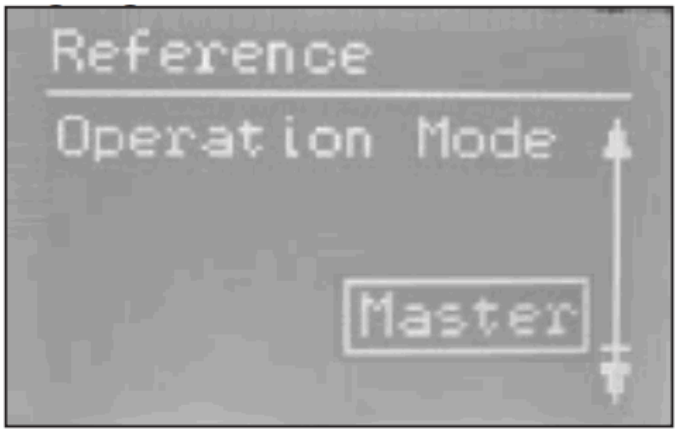
Menu's

Entrance to menus (see fig. 10) From Home Image the status menu can be reached by one push-on . From Home Image the Setup & service menu can be reached by one push and hold on . For entrance, a Login is required by the password given during commissioning.
Parameter mode (read/write mode) When maneuvering in Setup & service menu or Status menu there is an overall logic of showing possible actions for each parameter. Plain text: Read-only



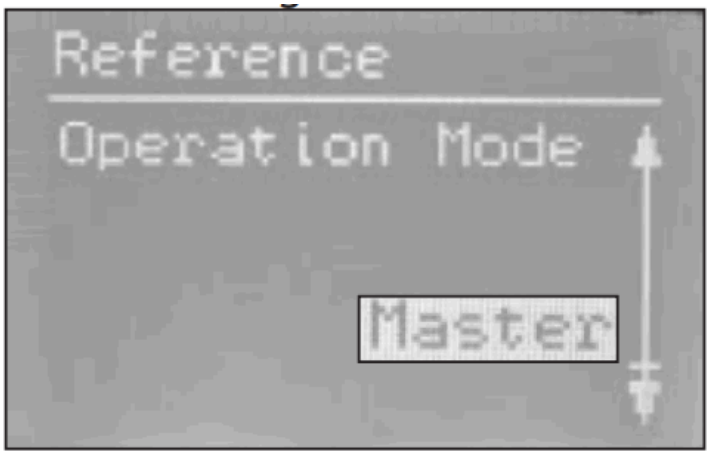
Framed text:

Parameter can be changed – push to highlight.



Highlighted text:

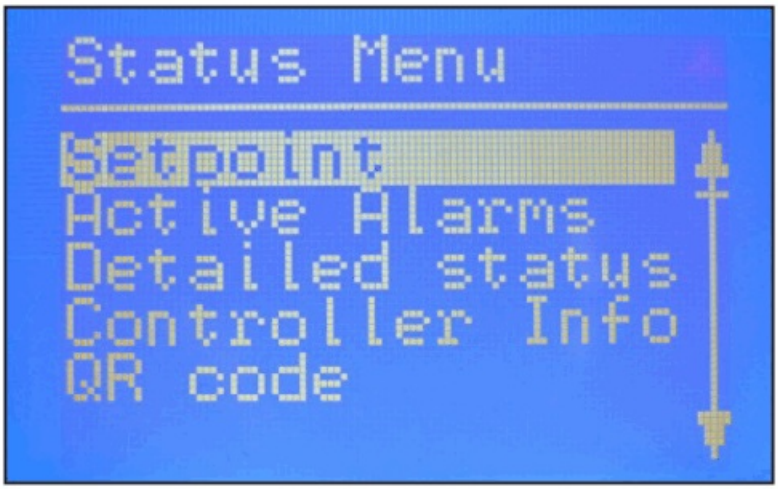
Scroll with / to the desired selection and push to enter the selection. Once entered the parameter is valid and the text changes to framed text.



Status menu

To enter Status menu from Home image:

Push once.



The Status menu is an open menu accessible for all. Therefore only 1 parameter can be changed from here. A selection of other parameters can be seen from the status menu:

Status menu (Open menu)

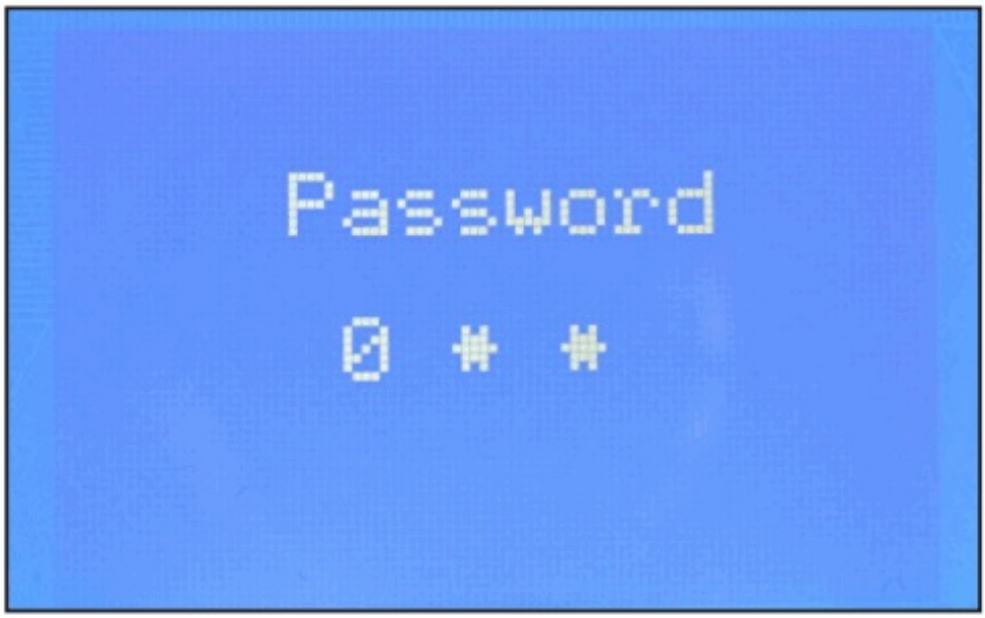
	Options
Setpoint	
Liquid level setpoint	0 – 100%
Active alarms Example of alarm content. The list will be empty in normal operation as no alarm is active.	
Level signal out of range	hours minutes
Standby mode	hours minutes
Detailed status	
Controller state	Stop, Manual, Auto, Slave, IO
Actual level	0.0 – 100%
Actual reference	0.0 – 100%
Actual OD	0.0 – 100%
Digital input status	On / Off
Actual level signal current	mA
Oscillation amplitude	0.0 – 100%
Oscillation period	sec
Controller Info	
Type	
Name (Controller name)	
SW (Software version)	
Bios (Bios version)	
Adr (Controller address)	
SN (Serial Number)	
PV (Product version)	
Site (Production site)	

QR code	
Code	

Read & Write
Read-only

Setup & service menu

(Requires log-in password assigned inCommisioning menu)



To enter the Setup and service menu from the Home image: Push and hold .
Maneuvering in the Status menu and the Setup and service menu's are done by use of the 4 push buttons shown in fig. 8.
The Setup & service menu is divided into 3 access levels, where personnel have individual authority.
The most advanced level is Commissioning, where you have access to change all allowable parameters, including

password issuing and a re-run of Setup wizard. The default password for commissioning is 300.
Service level is for service personnel and has fewer rights than commissioning. The default password is 200. The lowest level is for Daily use and allows only a few changes. The default password is 100.
Below table shows the authority given to the 3 levels.
Setup & service menu (Requires Log-In. Password to be assigned in Commissioning menu)

Parameter		**Options**	**User level – access**			**Default values**
			Daily	**Service**	**Commissioning**	
Reference	Main switch	On, Off	RW	RW	RW	Off
	Liquid level setpoint	0 – 100%	RW	RW	RW	50.0%
	Operation mode	Master, IO, Slave	R	R	RW (L)	Master
Alarm setup	Lower level limit	0 – 100%	RW	RW	RW	15%
	Upper level limit	0 – 100%	RW	RW	RW	85%
	Level alarm mode	Time, Hysteresis	R	R	RW	Time
	Lower delay	0 – 999 sec	R	RW	RW (D)	10 sec
	Upper delay	0 – 999 sec	R	RW	RW (D)	50 sec
	Lower level hysteresis	0-20 %	R	RW	RW (D)	3%
	Upper level hysteresis	0-20 %	R	RW	RW (D)	5%
	Function common alarm	Not follow; Follow up; Follow low; Follow all	R	R	RW	Not follow
	Oscillation detect band	0 – 100%	R	RW	RW (D)	100%
	Oscillation detect timeout	2 – 30 min	R	RW	RW (D)	20 min
	Force pump OFF in stop mode	Yes / No	R	RW	RW	No
	IO Lower level limit	0 – 100%	RW	RW	RW (D)	5%
	IO Upper level limit	0 – 100%	RW	RW	RW (D)	95%
	IO Lower level hysteresis	0-20 %	R	RW	RW (D)	3%
	IO Upper level hysteresis	0-20 %	R	RW	RW (D)	3%
	IO Lower delay	0 – 999 sec	R	RW	RW (D)	10 sec
	IO Upper delay	0 – 999 sec	R	RW	RW (D)	50 sec

	IO Level limit	0 – 100%	R	RW	RW (D)	50%
	IO Level delay	0 – 999 sec	R	RW	RW (D)	10 sec
	IO Level hysteresis	0-20 %	R	RW	RW (D)	3%
	IO Level action	Falling,Rising	R	RW	RW (D)	Falling
Control	Control Method	On/Off ,P, PI	R	RW	RW	PI
	Regulating principle	Low, High	R	RW	RW	Low
	P-band	5 – 200%	R	RW	RW (D)	30.0%
	Integration time T n	60 – 600 sec	R	RW	RW (D)	400 sec
	Neutral zone	0 – 25%	R	RW	RW (D)	2.0%
	Difference	0,5-25%	R	RW	RW (D)	2%
	Period time for AKV/AKVA	3-15 sec	R	RW	RW (D)	6 sec
	Minimum OD	0 – 99%	R	RW	RW (D)	0%
	Maximum OD	1 – 100%	R	RW	RW (D)	100%
Display	Language	EN,CN,PT,RU,SP,FR,IT, GER, ARAB	R	RW (L)	RW (L) (D)	EN
	Output indication	level, OD	R	RW	RW (D)	Level
	Login timeout	0 – 120 min	R	RW	RW	10 min
	Backlight timeout	0 – 120 min	RW	RW	RW	2 min
	Password daily	3 -digit, 0 – 999	N/A	N/A	RW	100
	Password service	3 -digit, 0 – 999	N/A	N/A	RW	200
	Password commission	3 -digit, 0 – 999	N/A	N/A	RW	300
	System configuration	ICAD+NC, ICAD, AKV/A+NC, AKV/A, NC only	R	R	RW (L)	ICAD + NC
	Level signal setup	AKS 4100, AKS 41, Current, Voltage	R	R	RW (L)	AKS4100
	Voltage at low liquid level	0-10V	R	RW	RW (D)	0 V
	Voltage at high liquid level	0-10V	R	RW	RW (D)	10 V
	Current at low liquid level	0-20 mA	R	RW	RW (D)	4 mA
	Current at high liquid level	0-20 mA	R	RW	RW (D)	20 mA

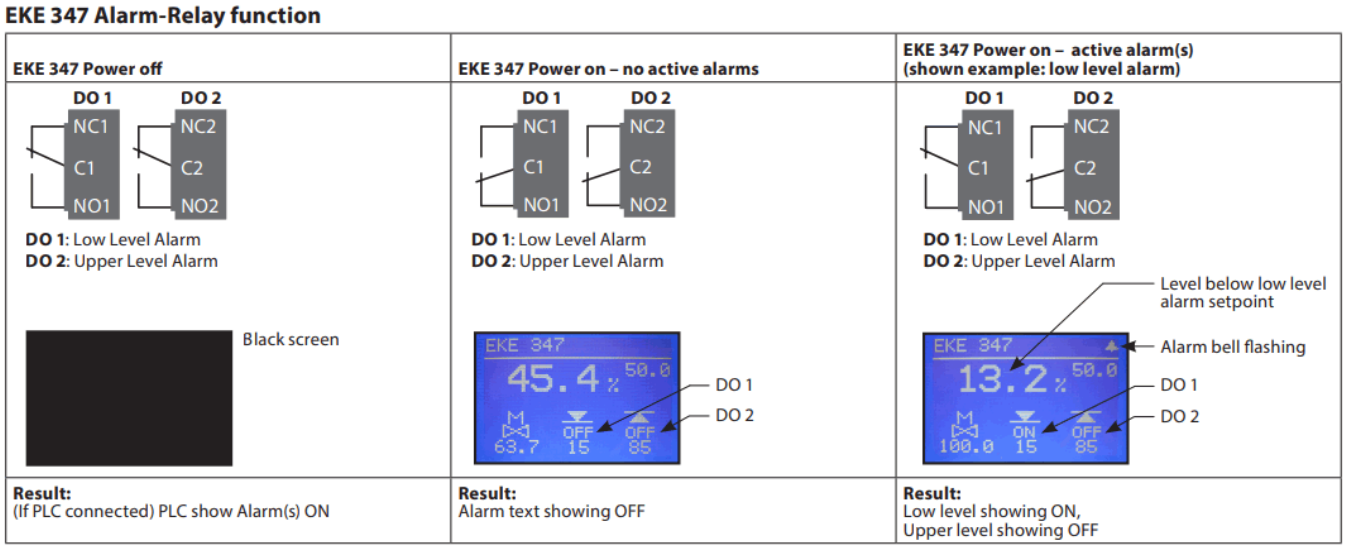
IO config	Valve position set up	Not used, Current, Voltage	R	R	RW (L)	Not used
	Voltage at closed valve position	0-10V	R	RW	RW (D)	0 V
	Voltage at open valve position	0-10V	R	RW	RW (D)	10 V
	Current at closed valve position	0-20 mA	R	RW	RW (D)	4 mA
	Current at open valve position	0-20 mA	R	RW	RW (D)	20 mA
	Common alarm setup	D04, High alarm, D03, Disp only	R	R	RW (L)	High alarm
	Multiple valve setup	Not used, 2 same cap, 2 dif cap, 3 same cap, 3 dif cap	R	R	RW (L)	Not used
	Multiple valve pattern	Parallel,Sequence	R	R	RW (D)	Parallel
	Valve A capacity	0-100 %	R	R	RW (L) (D)	50%
	Valve B capacity	0-100 %	R	R	RW (L) (D)	50%
	Valve C capacity	0-100 %	R	R	RW (L) (D)	30%
	ICAD takeover OD	0-100%	R	RW	RW (D)	80%
	IO module setup	Used, Not used	R	R	RW (L) (D)	Not used
Communication	CAN ID	1 – 127	R	R	RW	1
	CAN baudrate	20k, 50k, 125k, 250k, 500k, 1M	R	R	RW	500k
	Modbus ID	0 – 120	R	R	RW	1
	Modbus baud rate	0, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400	R	R	RW	19200
	Modbus mode	8N1, 8E1, 8N2	R	R	RW	8N1
	Modbus mapping	Operation, Setup	R	R	RW	Operation
	Valve B CAN ID	1 – 127	R	R	RW (D)	2
	Valve C CAN ID	1 – 127	R	R	RW (D)	3
	IO Mod. CAN ID	1 – 127	R	R	RW (D)	4

		User level – access	

Parameter		Options	Daily	Service	Commissioning	Default values
Service	Controller state		R	R	R	–
	Actual level		R	R	R (D)	–
	Actual referrence		R	R	R (D)	–
	Actual OD		R	R	R (D)	–
	Actual valve position		R	R	R (D)	
	Digital input status		R	R	R (D)	–
	Actual level signal voltage		R	R	R (D)	
	The actual level signal current		R	R	R (D)	–
	Actual position signal voltage		R	R	R (D)	
	Actual position signal current		R	R	R (D)	
	Actual OD A		R	R	R (D)	
	Actual OD B		R	R	R (D)	
	Actual OD C		R	R	R (D)	
	Manual Mode	On, Off	R	RW	RW (D)	Off
	Manual OD	0 – 100%	R	RW	RW (D)	50.0%
	Manual low alarm	Off-On	R	RW	RW (D)	Off
	Manual high alarm	Off-On	R	RW	RW (D)	Off
	Manual common alarm	Off-On	R	RW	RW (D)	On
	Apply defaults	None, Factory	N/A	N/A	RW (D)	None
Setup wizard	Setup wizard	Re-run Setup wizard	N/A	N/A	RW	–
I/O check	Main switch EKE act:	Off – On	R	R	R	Off
	AKS 4100 EKE act:	0 – 20 mA	R	R	R (D)	–
	ICAD EKE act:	4 – 20 mA	R	R	R (D)	–
	Nor. Close (NC) EKE act:	Off – On	R	R	R (D)	–

	Upper lvl (alarm) EKE act:	Off – On	R	R	R (D)	–
	Lower lvl (alarm) EKE act:	Off – On	R	R	R (D)	–
Controller name	Controller name	Type in controller name	RW	RW	RW	–

EKE 347 Alarm-Relay function



First-time start-up
(Setup wizard)
When all connections to the controller have been made, the first-time start-up can be performed.
After switching power on, the Danfoss logo will appear for 5 seconds The setup wizard will start.
During the setup wizard following sequence must be repeated for all parameter settings:
a) Parameter name + **1 st option**

b) Press to highlight **1 option**
c) Scroll with/to your desired option.

d) Press to set your choice **xxxxxx**
e) Scroll with to next parameter repeat sequence a to e)

1. **Language**

   You can select any of these 9 languages: English, Chinese, Portuguese, Russian, Spanish, French, Italian, German, Arabic
2. **System configuration** Select any of these 5 predefined configurations:

   ICAD + NC(solenoid) NC(solenoid) AKV/A AKV/A + NC(solenoid) ICAD
3. **Operation mode**

   Select any of these 3 predefined modes: Master (EKE 347 as Master controller) IO (EKE 347 as In/Out module) Slave (EKE 347 as slave for another Master
4. **Regulating principle**

   Select one of these 2 principles Low High
5. **Liquid level setpoint**

   Type in any level setpoint from 0% to 100% (default is 50.0%) 50.0%

6. **Lower level limit**

   Type in any limit from 0% to 100% (default is 15%) 15%

7. **Upper level limit**

   Type in any limit from 0% to 100% (default is 85%) 85%

8. **Level signal setup**

   Select one of these 4 predefined signal setup:

   AKS 4100

   Voltage

   Current

   AKS 41

9. **Valve feedback setup**

   Select one of these 3 predefined feedback setup (valve feedback is only possible with ICAD):

   Not used

   Voltage

   Current

10. **Common alarm setup**

    Select one of these 4 predefined methods:

    High Alarm

    D04

    Disp only (only Bell symbol flashing)

    D03

11. **Apply wizard settings**

    Press  to confirm all inputs or Press  to return to last menu

Once data entry has been confirmed, the controller has sufficient data to do a qualified regulation of your system.

You are now asked to select one of these
menus. Main menu Main switch I/O check

Press  for reaching the Setup & service menu or press  2 times for reaching the Home display image. If for some reason it is needed to un the setup wizard again, this is possible by log in to the setup & service menu with the commissioning authority.

Alarm and error codes:
When detecting an alarm from external sources or the flashing bell in the display, the alarm description can be found as a text message in the Status menu under Active
alarms.

Both alarms and errors will be shown here. If more alarms/errors occur simultaneously, they will be shown as subsequent text lines.

Alarms:
Upper level
Lower level
Standby mode
Valve B CAN ID conflict
Valve C CAN ID conflict
IO module CAN ID conflict
IO module communication
Communication to master lost
Min/max OD conflict
Common alarm HW conflict
Control method conflict
Multiple valve setup conflict
Valve C alarm
Valve B alarm
Oscillation in level signal
Valve position
Multiple valve capacity
Valve C communication
Valve B communication
Errors:
Internal error
Level signal out of range
Valve position signal out of range
Sensor supply overload
AKS 4100 error
Too much current AI3
Too much current AI4
DO4 overload

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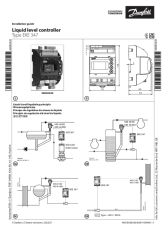
Documents / Resources

	Danfoss EKE 347 Liquid Level Controller [pdf] Installation Guide EKE 347, Liquid Level Controller, Level Controller, EKE 347, Controller